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ABSTRACT

The Southwest Regional Laboratory's Instructional Management System (IMS) central data processing system produces reports for dissemination to participating schools which provided the original source data to the system. Described in this document are the computer software routines (SIMS) that control the dissemination of information contained on IMS output report tapes to remote terminals located at the school sites. SIMS system logic, computer operator control instructions and commands, and a system flowchart are provided. (DGC)

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TITLE: SIMS, THE IMS COMSYS 3 REPORT DISSEMINATION SYSTEM

AUTHOR: John Yu

ABSTRACT

This report contains both the operations guide and the technical description of the 690 IMS ComSys 3 report dissemination system 'SIMS'. Although designed for IMS ComSys 3 mode of operation, SIMS disseminates reports to multiple on-site teleprinters with apparent simultaneity.

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SIMS, THE COMSYS 3 REPORT DISSEMINATION SYSTEM

John Yu

The 690 software system 'SIMS' is an interruptable IMS report dissemination system which presently serves up to three remote output terminals simultaneously. Input from the IMS report tape and output to the remote terminals via PT08's are controlled by 690 operator teletype commands. SIMS uses three PT08 output ports, two at 300 BAUD rate and one at 110. It also uses a line printer as a fourth output or monitor port. SIMS is a magnetic tape-to-core system: data are fetched from the tape and stored in 690 core for intermediate storage. Data is then fetched from core and transmitted to output ports. Because of the tape search requirements, SIMS is not able to handle a large amount of data for more than three ports without significant delay in the remote terminals.

THE EXECUTIVE

SIMS being an interruptable system requires an executive to handle interrupts and jobs. The executive handles jobs in the order in which they are scheduled. Interrupt priorities are fixed by the order in the interrupt chain so that the highest interrupt in the chain gets processed first.

Both 690 core modules are used; module 1 is used for the queues (a queue is a list for which all new entries are made at one end of the list and all deletions at the other end). Two types of queues, short and long, are used. Short queues are made up of linked short blocks of

data, and are used for job queue and other purposes. Long queues are made up of larger linked blocks, and are used exclusively for PT08 transmission data storage.

Jobs are scheduled in the Job Queue and are processed in the order they are scheduled. When the current job - the job in execution - is finished, the EXIT function starts the next job in the Job Queue. If no job is in the Job Queue, the NULJOB is run (when the NULJOB is running, all but the rotating bits of the AC are on). If the current job cannot be processed or completed due to a busy device, it NEXITs and is rescheduled before EXITing. Magnetic tape requests are queued in the Job Queue and processed by a main tape-controlling job MCONTL (before starting the magnetic tape job, the return job must be set in MAGRET). See Appendix A for the list of executive data handlers and their descriptions.

SYSTEM LOGIC

Teletype commands are used to control the operations of SIMS. The command decoder is a special character decoder and only keys on a set of characters. For example, to monitor PT08 port one, the command can be 'MONITOR 1', or simply 'M1', because the command decoder keys on the letter 'M' and the digit that follows it. When SIMS is loaded only (CONTROL B) is a recognized command. (CONTROL B) causes SIMS to search the input tape and build the file tables which are used to control data flow. Other commands can be entered after a bell rings. Three PT08's and the line printer are the available ports. Each port is assigned a wrap-around buffer of 377_8 registers. Each buffer is controlled by a table of

four pointers (Fig. 1): an input pointer which is used as the CA (current address) for a magnetic tape read command; an output pointer which points at the next location in the buffer where a data word is to be transmitted; a begin pointer which is used to reset the buffer pointers to the beginning; and, an end pointer which marks the limit of the filled buffer when a wrap-around is done.

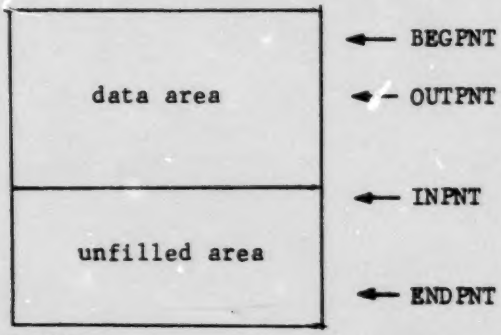

Fig.1. Format of a port buffer

A routine is used to control the storing and fetching of data to each buffer so that the input pointers and the output pointers are kept apart to avoid wiping out untransmitted data. Each file has a two-register file table. The first entry indicates the number of end-of-files from the begin-of-tape where the file is to be found. The second entry indicates the number of records to be skipped, starting from the first record of the file in question. All tape reads are positioned by file tables, and depending on which file is to be read, appropriate tape-skip commands are performed.

Input Logic

An input tape must have an IMS punch tape format (Fig. 2).

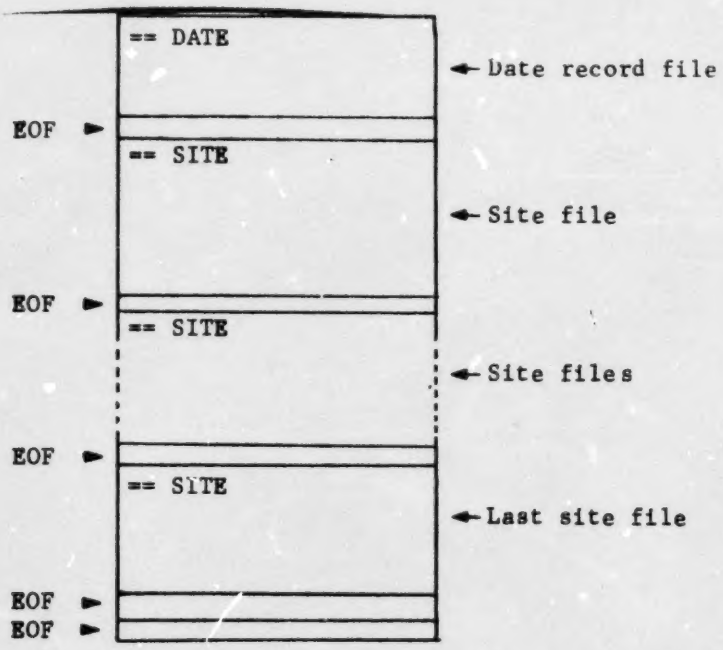

Fig.2. Tape format

The header information file must have at least one record. The first record is typed on the teletype and all other records to the first end-of-file are ignored. No specific requirement is imposed on the header information file. Each site file must start with a site identification record of the following format:

```
== SITE XX
   ↑      ↑
 col 1    2 digit site ID
```

SIMS can handle ten site files only. Additional site files require adding more file tables. Each time the input tape is positioned for input, the port buffer of the file is filled to as much as the input and output pointers of the buffer allow. The information about the current tape position in terms of the number of end-of-files from begin-of-tape is stored in a register FILECT. Tape movement is determined

by the file table of the particular file and FILECT. Input from a particular site file to a particular port buffer is assigned by an operator teletype command. When an end-of-file is detected during input from a site file, no further tape read job is scheduled for that site file. Tape read errors are retried five times with the record flagged with an asterisk in the eightieth column. Trailing blanks of input records are stripped and 7777 (used to indicate CRLF) is added.

Output Logic

All output ports are started off with a form feed (CONTROL L). Output characters are fetched from the PT08 port buffers and stored in port queues. Carriage returns and form feeds are treated specially. A carriage return is stored in a port queue with fifteen RUBOUT's as delay characters and a form feed is stored in a port queue with thirty-two RUBOUT's as delay characters. Port jobs are used to fetch characters from port queues. The PT08 interrupt handling routines are used to send data fetched by port jobs. Each port has a line count register for page control. A page can only have fifty-nine lines. Excess blank lines are ignored. Page formatting is also dependent on editing commands embedded in the site files. An edit command is defined to be a record of the form:

```
== XX
  ↑
col 1
```

where XX is the number of blank lines to be skipped before the next record. When a site file is completely sent, the message END OF TRANSMISSION is

sent to the port on a new page, and the message PORT X IS FREE is logged on the teletype, X being the port that is now free and can be used to send another file to a different site.

Monitor Function

Data transmitted through a port can be monitored by the line printer with a monitor command. Each character sent to the monitored port is also sent to the line printer except that RUBOUT's are ignored. A carriage return is changed into the edit control sequence: 34_8, 40_8. Line feeds are ignored. Port monitor can be terminated by a monitor termination command. If the printer is used as an output port, it cannot be used to monitor another port.

Carrier Detect and Port Abort

If the phone line is dropped during transmission, the carrier detect routines will notify the operator by typing out the message, PORT XX FAILURE, ABORTED, where XX is the PT08 port using the failed line. The port is automatically aborted. The operator can also abort a particular port by using the command AX, where X is the port number to be aborted. Whenever a port is aborted, the port is freed and the file table of the file using the port is reinitialized and the port queue is flushed.

OPERATION INSTRUCTIONS

This section consists of the operating instructions for the SIMS system.

1. Get monitor by doing a (CNTRL C).
2. Mount the Report Tape (IMS Report Tape) on any available tape drive. Set the drive to unit 2 and make sure that no other drive is set to unit 2. The Report Tape must be ON-LINE and at LOAD.
3. Load and start SIMS. If tape unit 2 is ready, the system responds with a carriage return and line-feed and one bit can be seen rotating across the AC. If tape unit 2 is not ready, the system hangs and waits for tape 2. To get the system going, put tape 2 at LOAD and ON-LINE.
4. Do a (CNTRL B) on the teletype. The first record of the header file is typed out, then SIMS lists out the files on the tape with their site ID's and the number of card image records in each file. A bell rings when SIMS finishes searching through the Report Tape. If the tape does not conform to the input tape format, the system crashes.
5. Pick a particular site (in the listing obtained in Step 4) and dial up the phone corresponding to that site with one of the PT08 ports (Data Sets). After making contact, press the DATA button. Each site is assigned a phone number.
6. Type on the teletype, FILE X, PORT Y (or just FXPY), where X is the file number assigned to the particular site which has

been connected in Step 5 above, and Y is the port number assigned to the Data Set used. For now, the ports are assigned as follows:

Port # assigned	Device Code	Speed
01	40,41	300 BAUD
02	42,43	300 BAUD
03	44,45	110 BAUD

The printer can be used as port 4.

7. Repeat steps 5 and 6 if more than one site report is to be sent. Port XX is freed when a message, PORT XX IS FREE, is typed out by the system.
8. To monitor the output of a particular port with the line printer, type MONITOR X (or simply MX), where X is the port number to be monitored.
9. To terminate the monitor function, type B. If in the process of monitoring a port, that port is freed, type B to release the printer. To abort a port, type AX, where X is the port number to be aborted. If line failure is detected, the port using the line is automatically aborted and freed, the message, PORT X FAILURE, ABORTED, is typed by the system.
10. All commands are to be terminated by a carriage return; an incorrect command can be aborted with a RUBOUT prior to the carriage return. An illegal command gets a question mark as the response.

Memory Allocation

Program body:		0-5177; mod 0
Buffers :	PT08#1	5177-5577; mod 0
	PT08#2	5577-6177; mod 0
	PT08#3	6177-6577; mod 0
	Printer	6577-7177: mod 0

Short Queues: 400 - 1777, 4 register per block; mod 1

Long Queues : 2000 - 7000, 10 register per block; mod 1

OPERATOR TELETYPE CONTROLS

Teletype Command	Desired Action
(CNTRL B)	Start tape search and list out the site numbers.
FILE X PORT Y or simply FXPY	X is the file number of the file to be read, Y is the port number of the port which data from file X is to be sent.
MONITOR Y or simply MY	Y is the port to be monitored using line printer.
B	Break the monitor function.
AY	Abort port Y
(CNTRL C)	Exit

APPENDIX A

EXECUTIVE DATA HANDLERS

The data handlers, their functions and their operation states (ION-interrupt on or IOF-interrupt off) are listed below:

Data Handler	Function	Enter State	Operation State	Exit State
For Scheduled Jobs				
STORES	Store (AC) into Short Queue	ION	IOF	ION
STOREL	Store (AC) into Long Queue	ION	IOF	ION
FETCHS	Fetch from Short Queue	ION	IOF	ION
FETCHL	Fetch Long Queue	ION	IOF	ION
FLUSHL	Flush Long Queue	ION	IOF	ION
EXIT	Leave a job and start the next	ION	IOF	ION
NEXIT	Reschedule current job and EXIT	ION	IOF	ION
For Interrupt Processors				
SAVES	Store into Short Queue	IOF	IOF	IOF
TAKES	Fetch from Short Queue	IOF	IOF	IOF
IRPXIT	End interrupt processor and continue current job or EXIT	IOF	IOF	ION

FLOWCHARTS

PROGRAMMER: John Yu
PROGRAM ID: SIMS, Operation Flowchart Chart
DATE: April, 1972
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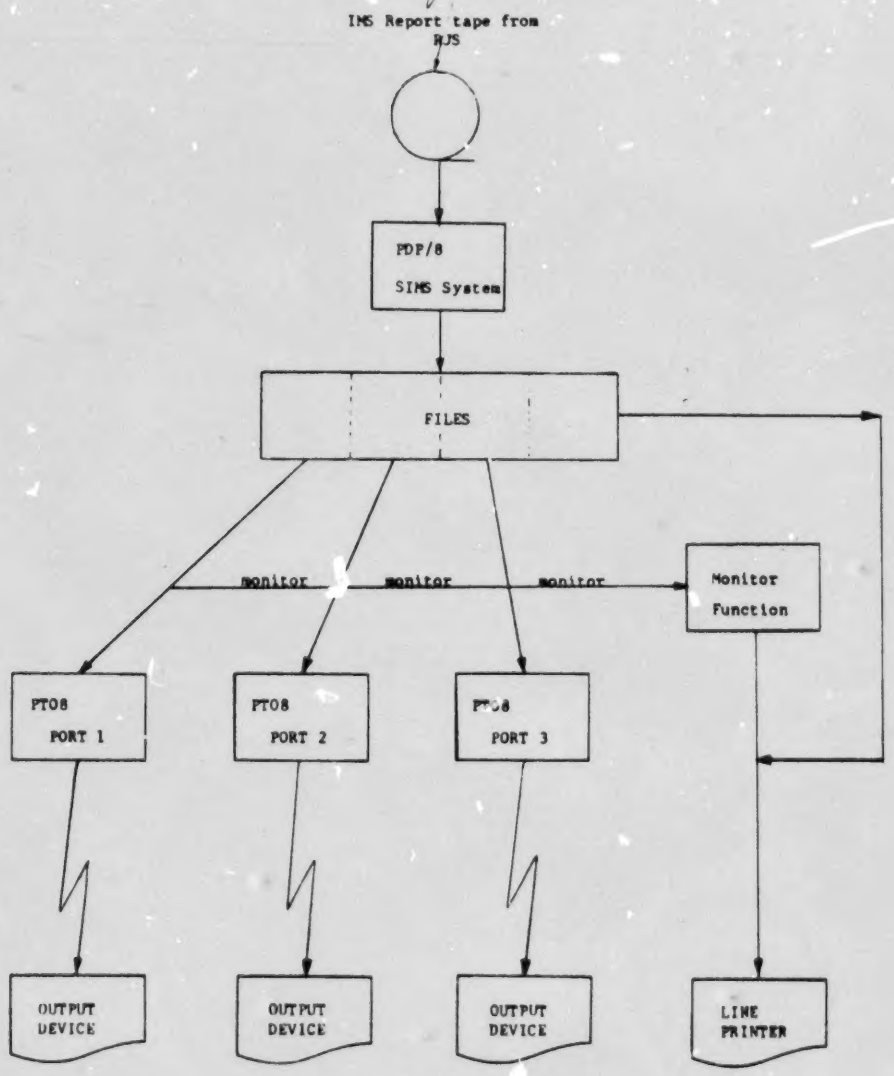

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